

# The NCGC BioPlanet

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Ruili Huang, Ph.D.

NIH Chemical Genomics Center

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# The NCGC BioPlanet

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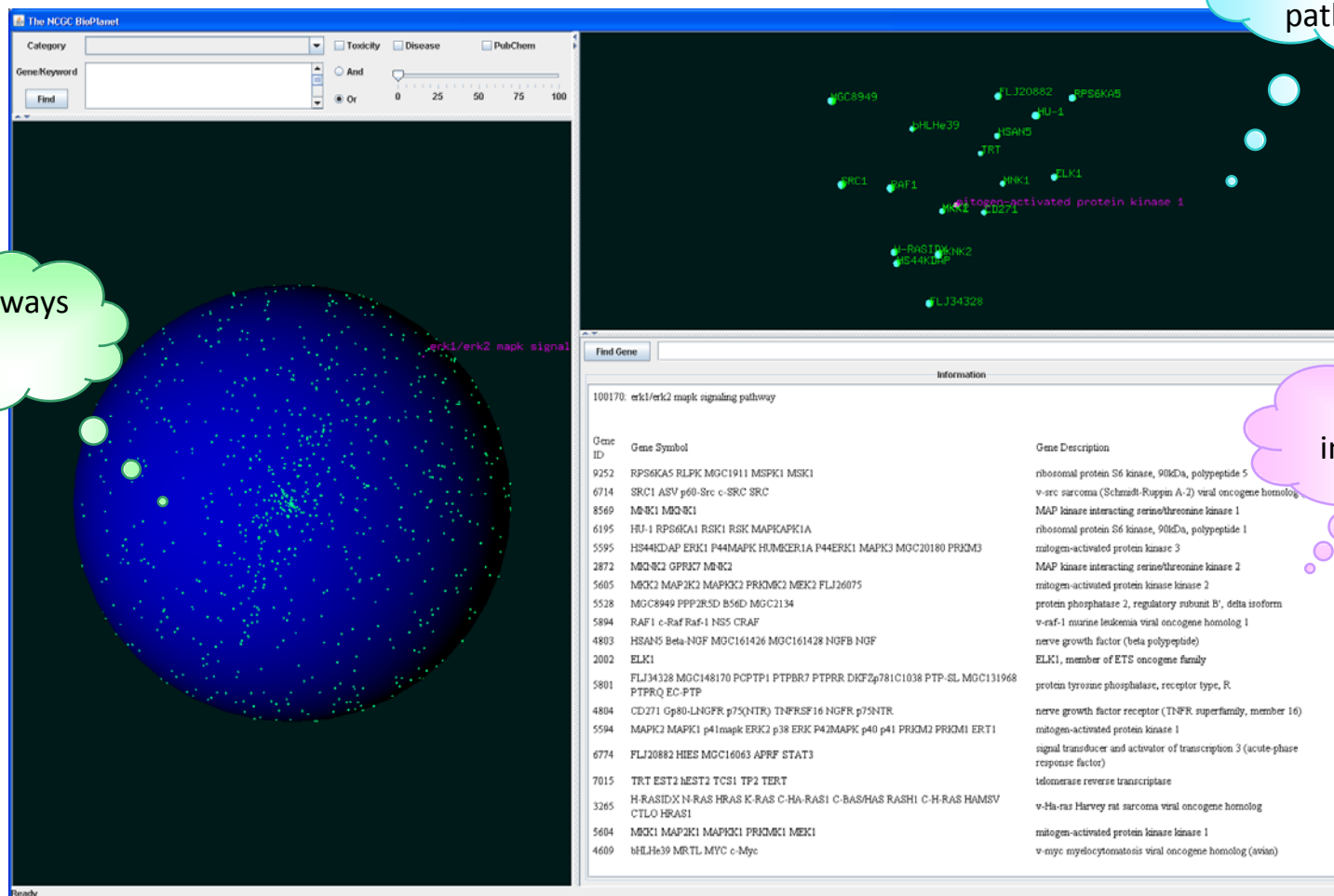
- Hosts the universe of pathways
- All pathway annotations from manually curated, public sources
- Integrates pathways from different data sources
- Annotates pathways by source, species, biological function/process, disease/toxicity relevance, assay availability
- Easy visualization, browsing, analysis of pathways
- Facilitates pathway assay selection/prioritization for Tox21 production phase
- Will be publicly available

# The Universe of Pathways

Detailed  
view of a  
pathway

Pathways

Gene  
information



~1100 human pathways mapped to the pathway globe

# Pathways with available assays - PubChem

The NCGC BioPlanet

Category:  ☐ Toxicity ☐ Disease ☒ PubChem ☐ ToxCast ☐ Tox21 ☐ NCGC

Gene/Pathway:

☐ And ☐ Or

0 25 50 75 100

Homologous recombination

0 pathways found.

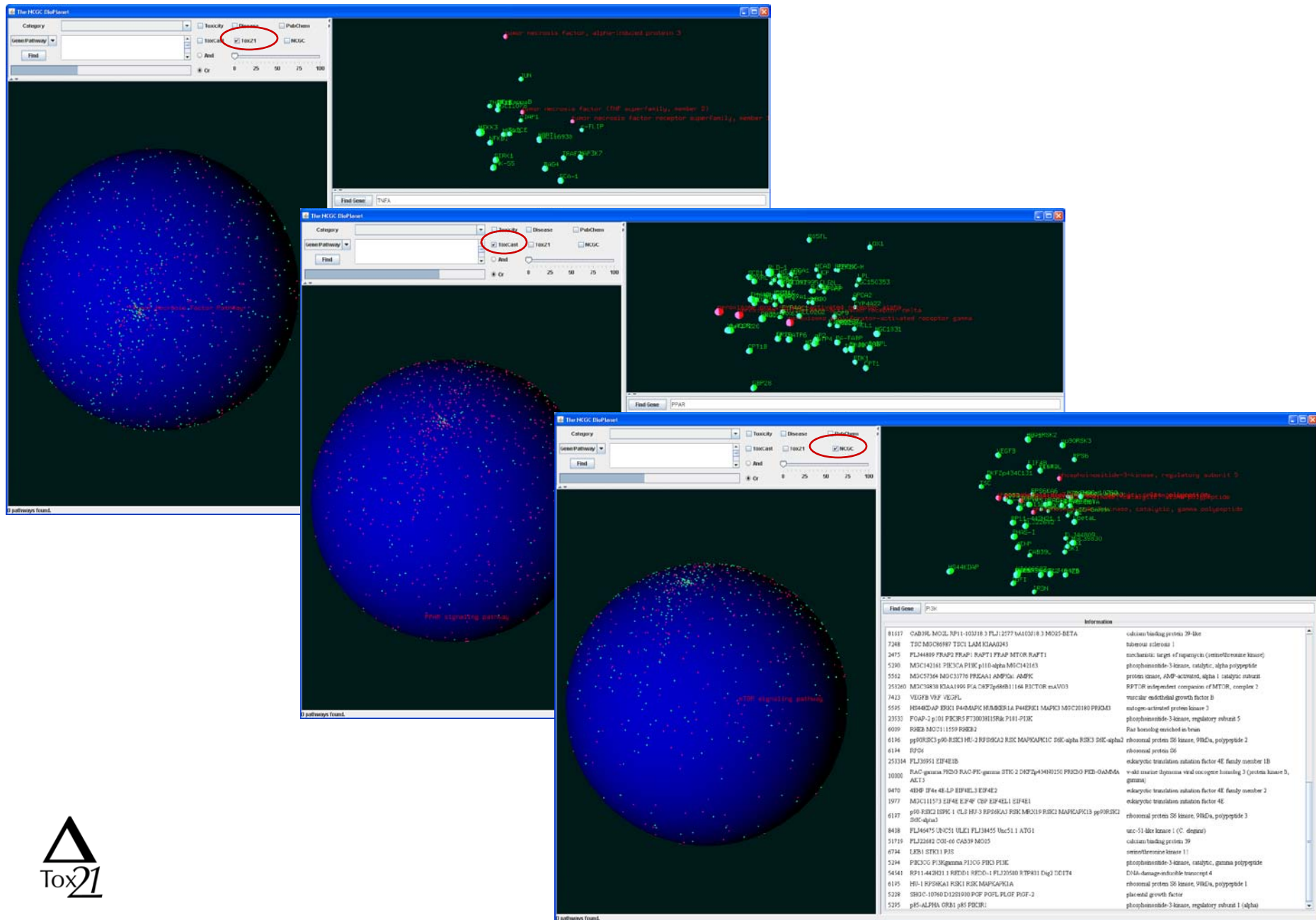
Find Gene: thioredoxin

Information

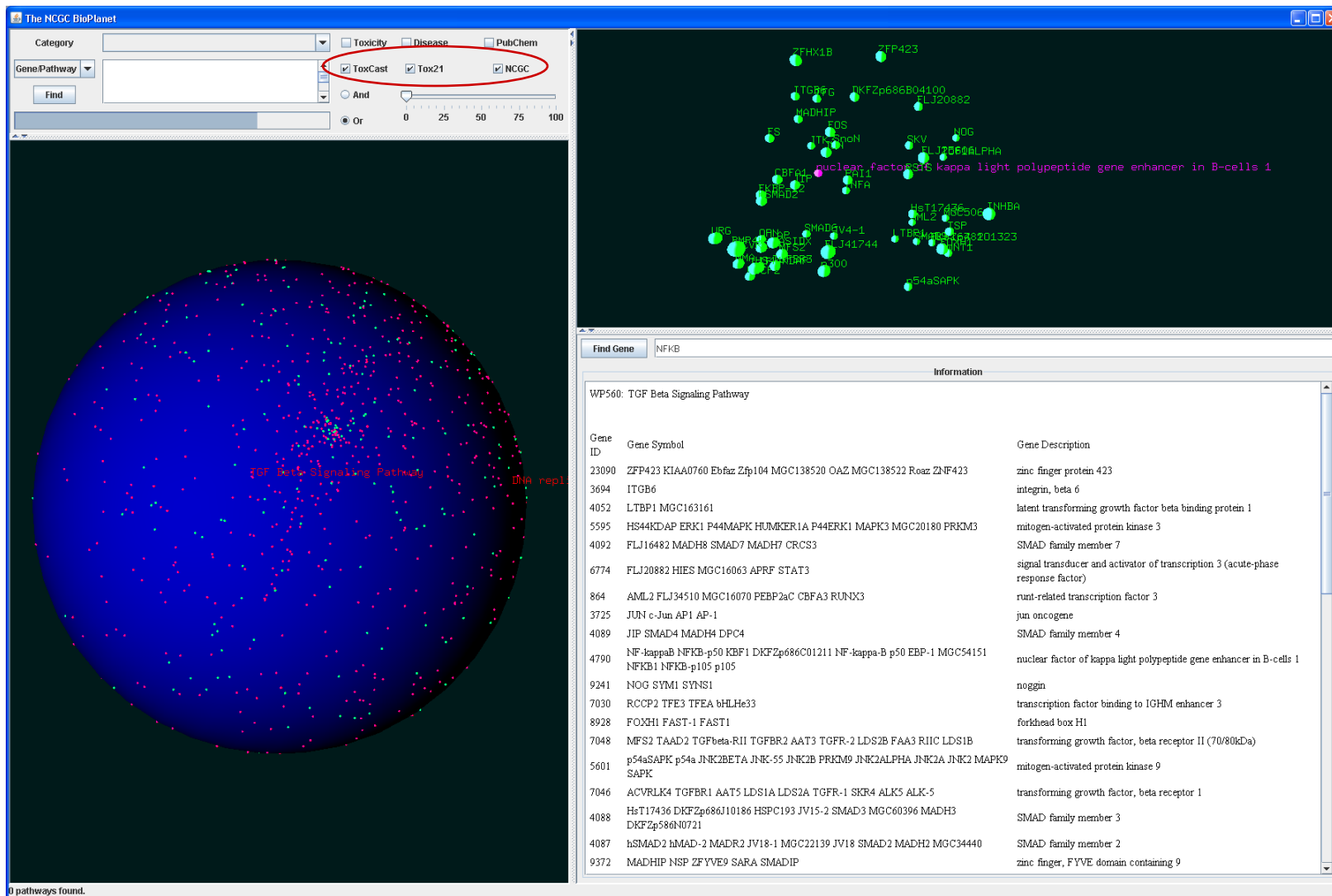
hsa03440: Homologous recombination

Gene ID	Gene Symbol	Gene Description
5889	RAD51C RAD51L2 MGC104277	RAD51 homolog C (S. cerevisiae)
5425	POLD2	polymerase (DNA directed), delta 2, regulatory subunit 50kDa
6119	REPA3 RPA3	replication protein A3, 14kDa
6742	SOSS-B1 SSBP1 SSBP	single-stranded DNA binding protein 1
25788	FSBP RDH54 RAD54B	RAD54 homolog B (S. cerevisiae)
29935	MGC120334 HSU24186 MGC120333 RPA4	replication protein A4, 34kDa
7516	XRCC2 DKFZp781P0919	X-ray repair complementing defective repair in Chinese hamster cells 2
5888	HsT16930 HRAD51 RAD51A HsRad51 BRCC5 RECA RAD51	RAD51 homolog (RecA homolog, E. coli) (S. cerevisiae)
5424	CDC2 POLD1 POLD	polymerase (DNA directed), delta 1, catalytic subunit 125kDa
4361	HNGS1 MRE11B ATLD MRE11A MRE11	MRE11 meiotic recombination 11 homolog A (S. cerevisiae)
675	GLM3 BRCC2 BROVCA2 FANCD1 FANCD FAD1 BRCA2 FAD FANCB FAD	breast cancer 2, early onset
4683	FLJ10155 NBN MGC87362 NBS1 NBS ATV AT-V2 P95 AT-V1	nibrin
7156	TOP3 TOP3A	topoisomerase (DNA) III alpha
7517	XRCC3	X-ray repair complementing defective repair in Chinese hamster cells 3
146956	FLJ131364 EME1 MMS4L	essential meiotic endonuclease 1 homolog 1 (S. pombe)
10111	hRad50 NBSLD RAD50-2 RAD50	RAD50 homolog (S. cerevisiae)
641	RECQL3 MGC131618 BS BLM RECQ2 MGC131620 MGC126616 RECQL2	Bloom syndrome, RecQ helicase-like
10714	POLD3 P66 P68 MGC119643 KIAA0039 MGC119642	polymerase (DNA-directed), delta 3, accessory subunit
5893	RAD52	RAD52 homolog (S. cerevisiae)
6118	RPA2 RPA32 REPA2	replication protein A2, 32kDa
8940	FLJ39376 TOP3B	topoisomerase (DNA) III beta
8438	hRAD54 RAD54A HR54 hHR54 RAD54L	RAD54-like (S. cerevisiae)
80198	FLJ21012 MUS81 FLJ44872	MUS81 endonuclease homolog (S. cerevisiae)

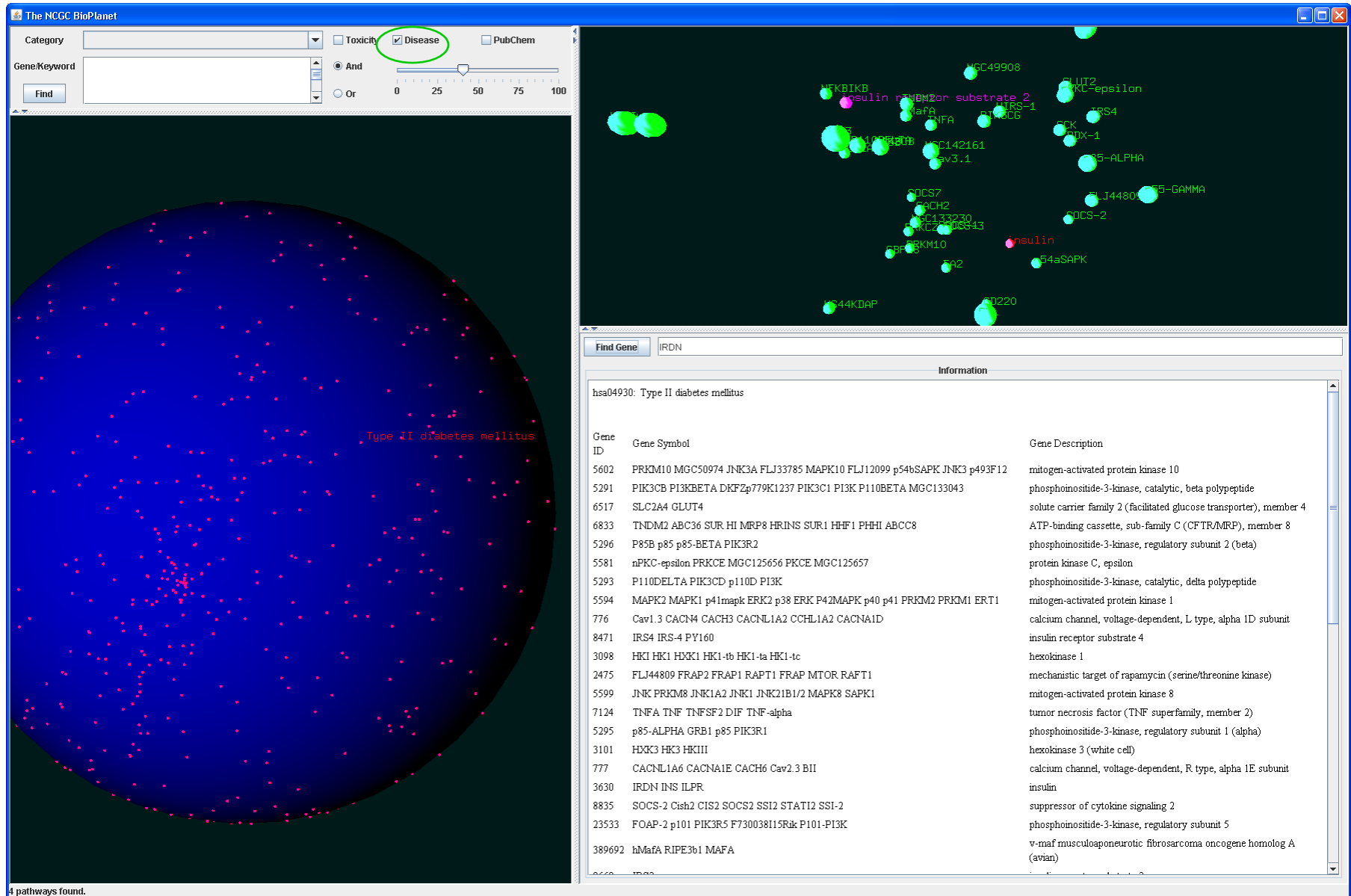
# Pathways with available assays – Tox21, ToxCast, NCGC



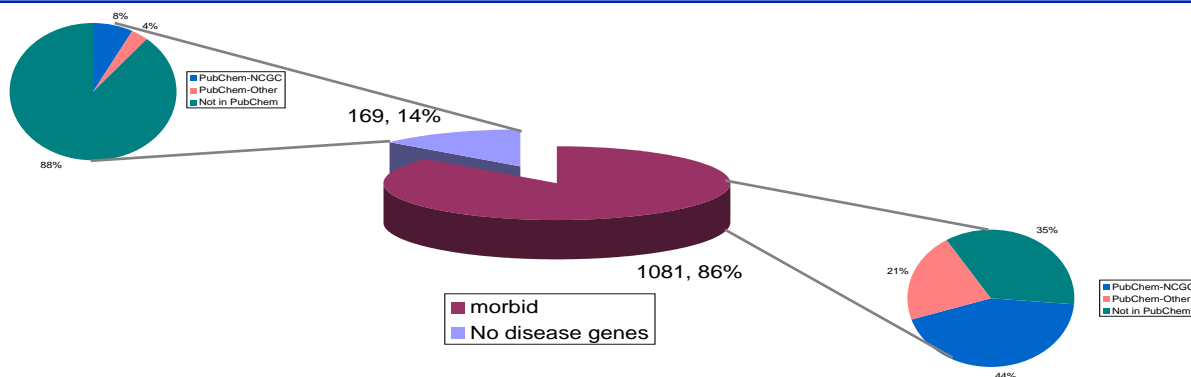
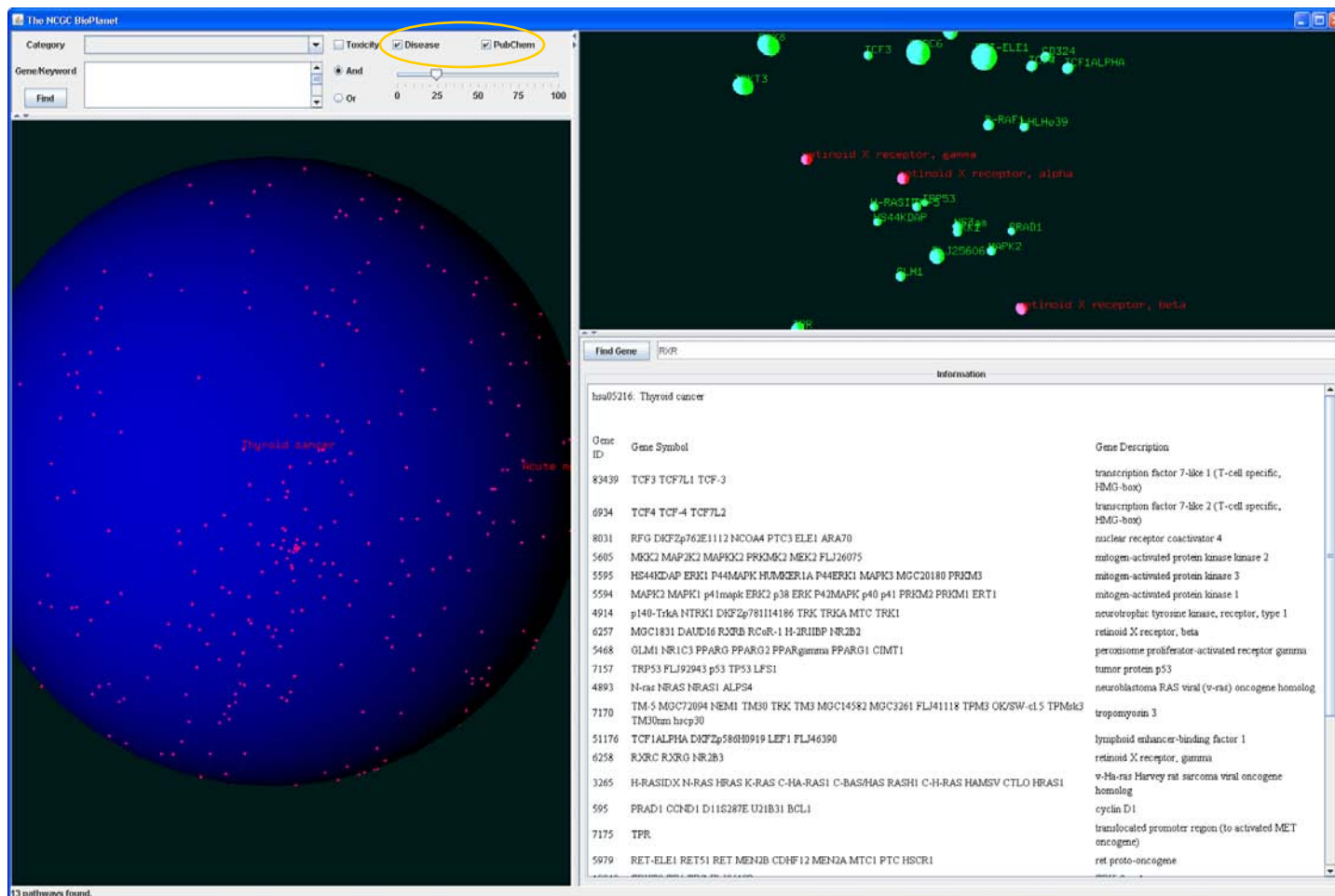
# Pathways with available assays – Tox21, ToxCast, NCGC



# Disease pathways

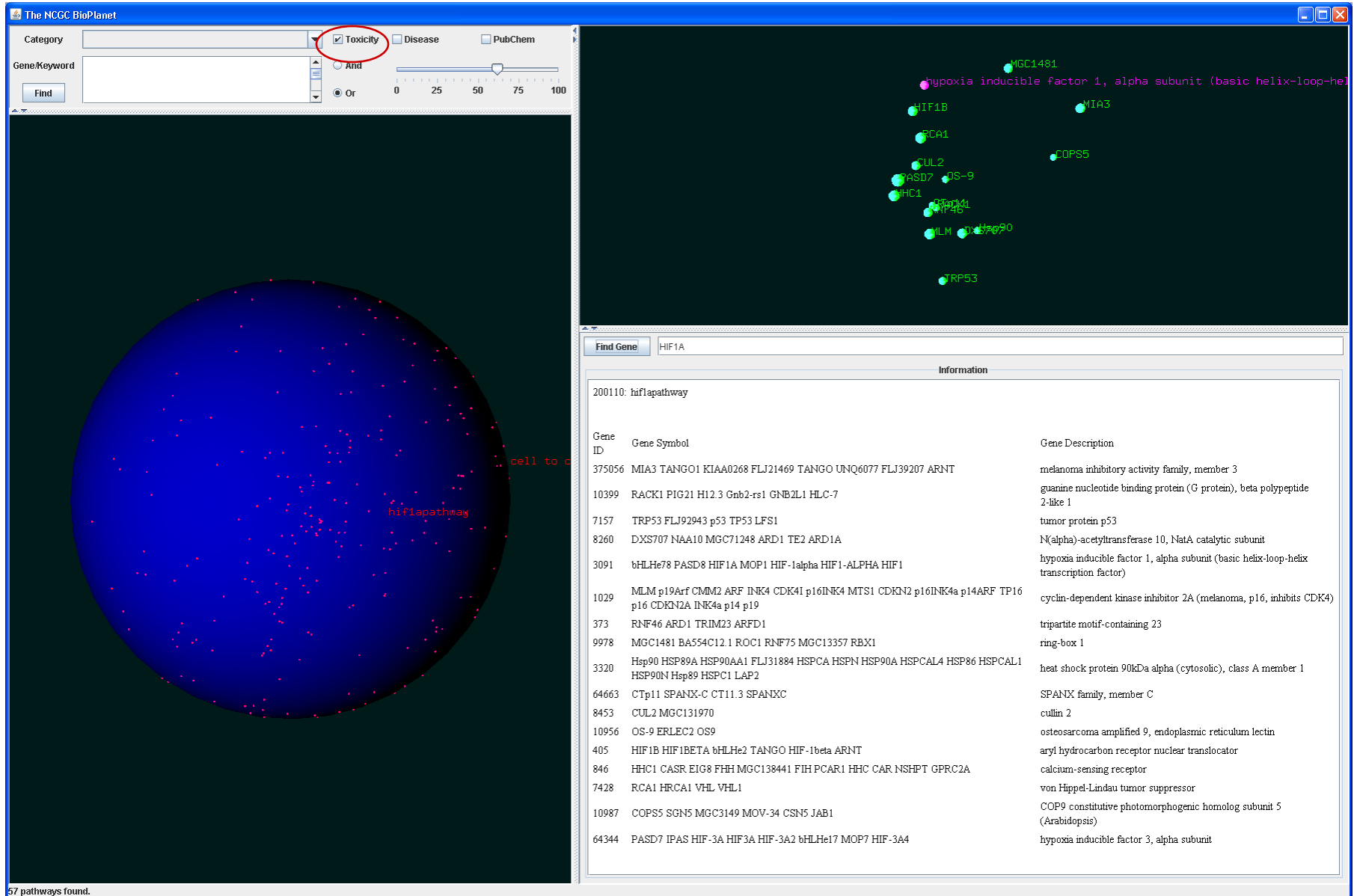


# Disease pathways covered by PubChem assays

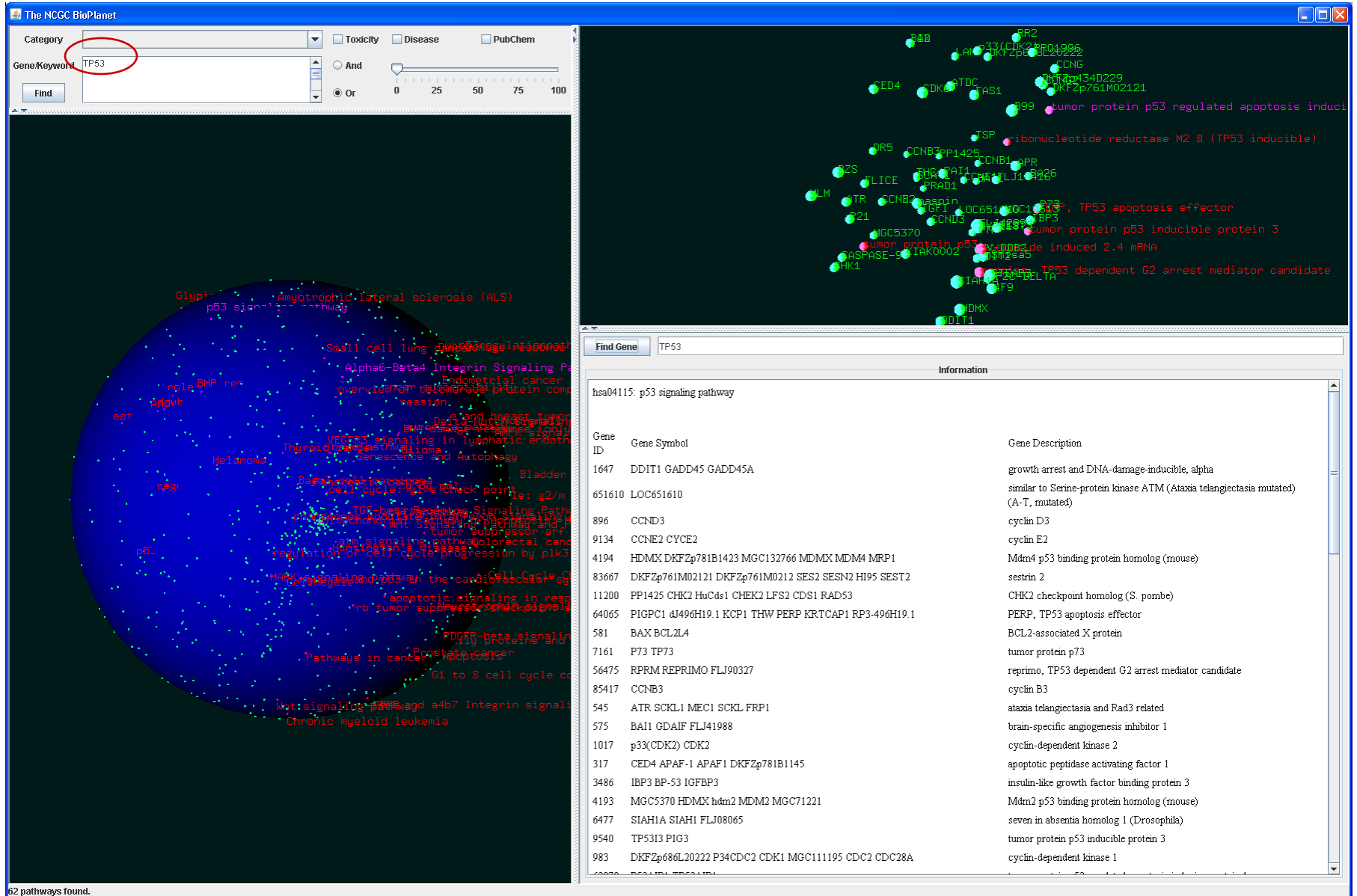




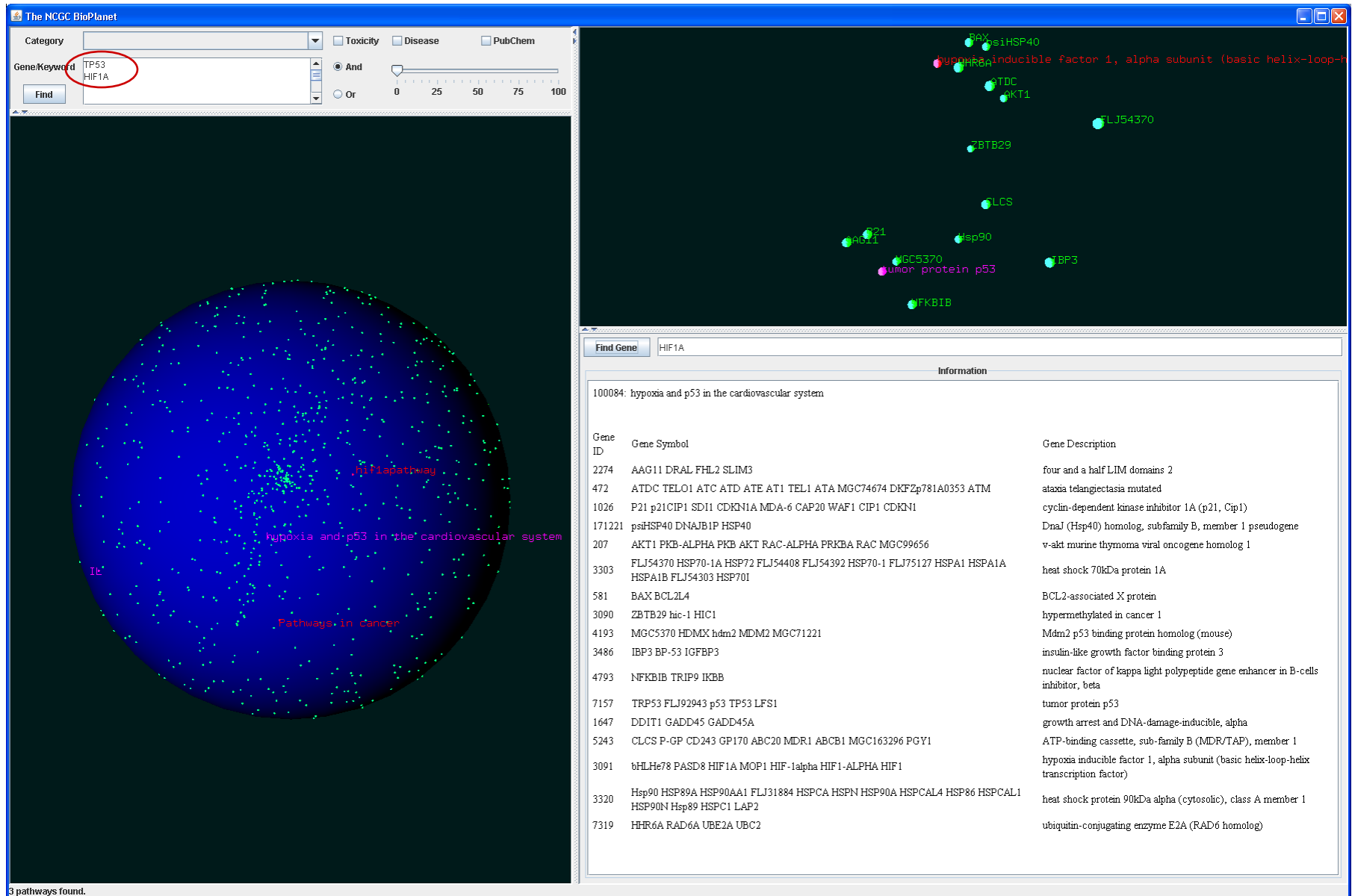
# Toxicity Pathways



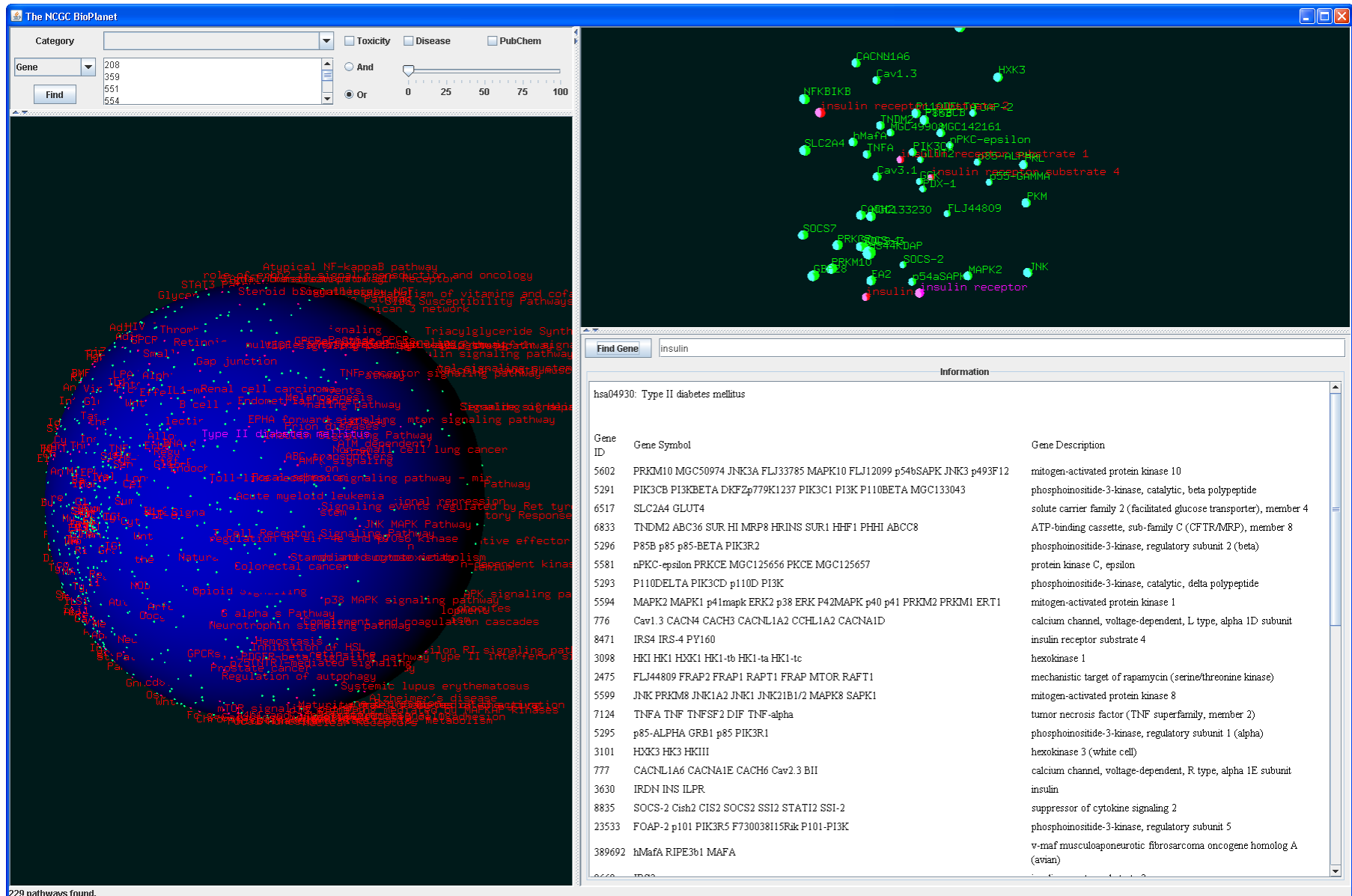
# Pathways involving P53



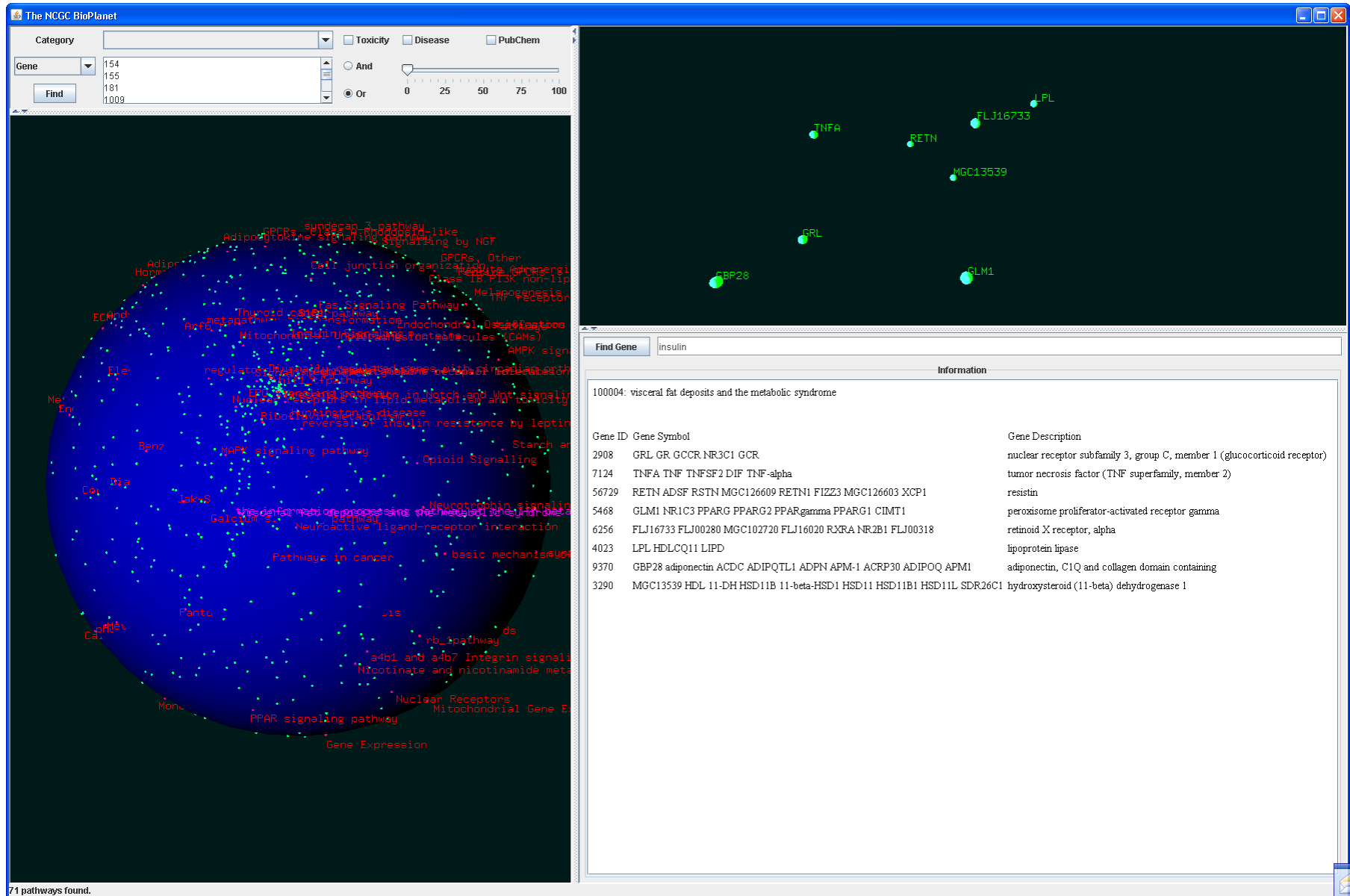
# Pathways involving both P53 and HIF1A



# Pathways containing diabetes genes



## Pathways containing obesity genes



# Applications

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- Pathway prioritization for Tox21
  - Toxicity pathways
  - Disease pathways
  - Assay availability
    - PubChem
    - Commercial assays
    - Develop new assays for pathways with no coverage
- Future developments
  - Link compound activity data
  - Incorporate other data forms: sequence data, gene/protein expression data, etc.?
  - Other species: rat, mouse, etc.
  - Organize assays according to pathways/diseases/toxicity endpoints